WHAT IS CLAIMED IS:

1. A microswitch, comprising:

a substrate;

a first electrode portion fixed to the substrate and having a first contact surface, the first electrode portion including a first layer formed of a first carbon series material and provided with a group of first fine holes extending to reach the first contact surface, and first metal segments formed of a first metal material and buried in the first fine holes, respectively;

a second electrode portion arranged to face the first electrode portion with a gap provided therebetween and having a second contact surface movable toward the first electrode portion, the second electrode portion including a second layer formed of a second carbon series material and provided with a group of second fine holes each extending to reach the second contact surface, and second metal segments formed of a second metal material and buried in the second fine holes, respectively; and

a deformable structure configured to support the second electrode portion on the substrate to face the second contact surface to the first contact surface with a gap in a non-contact state, and configured to be deformed to shift the second electrode portion and contact the second contact surface with the first

contact surface in a contact state.

2. The microswitch according to claim 1, wherein the first fine hole extends through the first layer toward the first contact surface, and the second fine hole extends through the second layer toward the second contact surface.

3. The microswitch according to claim 1, wherein the substrate has a surface, the deformable structure includes a base portion fixed to the substrate and a movable portion extending from the base portion along the surface of the substrate with a second gap, and the second electrode portion is fixed to the movable portion.

4. The microswitch according to claim 3, wherein the first fine hole extends through the first layer toward the first contact surface, and the second fine extends through the second layer toward the second contact surface.

5. The microswitch according to claim 1, further comprising a first contact layer electrically connected to the first metal segments, and a second contact layer electrically connected to the second metal segments.

6. The microswitch according to claim 1, wherein the first layer and the first metal segment have a coincident surface on the first contact surface.

7. The microswitch according to claim 1, wherein the second layer and the second metal segments have

a coincident surface on the second contact surface.

8. The microswitch according to claim 1, wherein the first fine holes are opened on the first contact surface, and the first metal segment has an end defining recess in the corresponding first fine hole.

9. The microswitch according to claim 1, wherein the second fine holes are opened on the second contact surface, and the second metal segment has an end defining recess in the corresponding second fine hole.

10. The microswitch according to claim 1, wherein each of the first and second carbon series material is a material selected from the group consisting of diamond doped with an n-type or p-type impurity and graphite.

11. A method of manufacturing a microswitch, comprising:

forming a first electrode portion having a first contact surface on a substrate such that the first electrode portion is fixed to the substrate, the forming the first electrode portion including:

forming a first carbon series material layer on the substrate;

forming a first metal layer on the first carbon series material layer;

subjecting the first metal layer to an anodic oxidation within an acidic solution so as to form a first porous film in at least a surface region of

the first metal layer;

subjecting the first carbon series material layer to an anisotropic etching with the first porous film used as a mask so as to form a group of first fine holes; and

burying a first metal material in each of the first fine holes;

forming a second electrode portion positioned to face the first electrode portion with a gap, the second electrode portion having a second contact surface movable toward the first electrode portion, the forming the second electrode portion including:

forming a sacrificial layer having a pattern on the substrate;

forming a second carbon series material layer on the sacrificial layer and on the substrate;

forming a second metal layer on the second carbon series material layer;

subjecting the second metal layer to an anodic oxidation within an acidic solution so as to form a second porous film in at least a surface region of the second metal layer;

subjecting the second carbon series material layer to an anisotropic etching with the second porous film used as a mask so as to form a group of second fine holes; and

burying a second metal material in each of

the second fine holes; and

forming a deformable structure configured to support the second electrode portion on the substrate to face the second contact surface to the first contact surface with a gap in a non-contact state, and configured to be deformed to shift the second electrode portion and contact the second contact surface with the first contact surface in a contact state, the forming the deformable structure including removing the sacrificial layer.

12. The method of manufacturing a microswitch according to claim 11, wherein the metal layer is formed of one material selected substantially from the group consisting of aluminum, titanium, tantalum, copper and an alloy thereof.